Does Crowdsourced Research Discipline Sell-Side Analysts?

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Sell-Side Analysts in Capital Markets

- Sell-side investment research contributes to
  - Greater price discovery (e.g., Gleason and Lee, 2003)
  - Lower information asymmetry and cost of capital (e.g., Kelly and Ljungqvist, 2012)

- But is subject to biases due to various conflicts of interest
  - Optimistic long-horizon earnings forecasts and recommendations
  - **Pessimistic short-horizon earnings forecasts (e.g., Matsumoto, 2002)**
- Adversely affecting
  - Market prices (e.g., Veenman and Verwijmeren, 2018)
  - Retail investors (e.g., Malmendier and Shantikumar, 2007)

Forces Constraining Sell-Side Bias

- **Competition (Hong and Kacperczyk, 2010)**
- Reputational concerns (e.g., Fang and Yasada, 2009)
- Regulation (e.g., Kadan et al., 2009)

Does external, technology-engendered competition discipline the sell-side?

Competition and Bias #1 (Hong and Kacperczyk, 2010)

- "Competition means a greater diversity of preferences among suppliers of information (analysts in our context) and **hence a greater likelihood of drawing at least one independent supplier or analyst** whose preference is such that he or she cannot be bought by the firm. **This supplier's independence can have a disciplining effect on other suppliers."**

Competition and Bias #2 (Hong and Kacperczyk, 2010)

- "A second channel whereby competition limits bias that also holds in this market is that a firm's cost of influence increases with the number of suppliers or analysts…**So the bribe that must be paid to each analyst to suppress information is thus independent of *N*, and so the total bribe is increasing in *N*."**
  - Costlier to bribe 20 analysts than 2 analysts

ONE-THIRD
OF INSTITUTIONAL INVESTORS SAY SOCIAL MEDIA HAS IMPACTED THEIR INVESTMENT DECISION PROCESS.

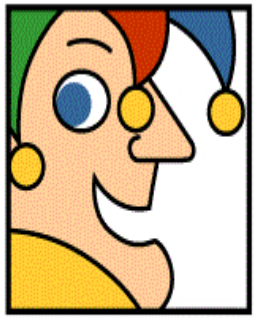
StockTwits®

Seeking Alpha$^{\alpha}$

estimize

SumZero

INFORMATION ABOUT **S&P 500 FIRMS** THAT'S DISSEMINATED VIA FINANCIAL BLOGS APPEARS TO BE LEVELING THE PLAYING FIELD BETWEEN TRADITIONAL INVESTORS AND CORPORATE INSIDERS.



The Motley Fool

Estimize

- Open platform that crowdsources earnings forecasts from buy-side analysts, industry professionals, individual investors, etc.
- Founded by former hedge fund analyst with the objective of *“disrupting the whole-sell side analyst regime”*
- Crowdsourcing can lead to a superior consensus because
  - It captures the collective wisdom of a large and diverse group
  - Estimize contributors are likely to be free of the conflicts of interest that bias sell-side research

Why Estimize?

- Estimize is “the draw of an independent supplier or analyst”
- Estimize contributors cannot be bribed with management access or underwriting business.
- Estimize forecasts are
  - Informative and less biased (Jame et al., 2016)
  - Freely available and highly visible
  - Distributed together with the sell-side consensus

Why Estimize?

- Primarily short-term
  - Allows a sharp prediction of what bias is affected

- Only competitor in the market for earnings estimates
  - Allows a sharp prediction of when bias is affected

- "***Adjusting for bias in short-term forecasts is harder.*** *It is tempting simply to accept the errors--after all, they tend to be off by just a little…* ***An alternative is to look at crowdsourcing websites such as Estimize.*** *There punters--some amateur, and some professional--are shown Wall Street consensus estimates and asked to make their own forecasts. Estimize users beat Wall Street estimates two-thirds of time."* (*The Economist*, 3 Dec. 2016, p. 64)

Hypothesis

- Estimize raises analyst cost of issuing biased research by making it easier for investors to unravel and penalize sell-side bias

- Estimize raises firm cost of influencing consensus by increasing the number of forecasters

- ***Sell-side pessimism declines after a firm is added to Estimize***

Tension

- Those least likely to unravel bias may not matter to the sell-side
- Those who matter may already unravel bias or tolerate bias, if it buys them management access
- Firms may invest more to influence and shape sell-side coverage
- Sell-side may view crowdsourced research as a fad and not respond

Difference-in-Difference Approach

- Treatment firms: added to Estimize in 2012
- Control firms: not added as of 2015 but similar to treated firms
- Before (after): 2009-2011 (2013-2015)
- Main outcome Variable = *Bias/Prc*
  - *Bias/Prc = (Actual – Consensus)/Price * 100*

Summary of Key Results

- Decline in short-term forecast pessimism for firms added to Estimize

- Better conditions for learning ⇏ greater decline in bias
- Greater need for disciplining ⇒ greater decline in bias

- No decline in bias for longer-horizon forecasts and recommendations

Estimize Summary Statistics: Table 1

Panel A: Breadth and Depth of Estimize Coverage

Year	Firms Covered	Contributors	Forecasts	Contributors per Firm-Quarter: Mean	Contributors per Firm-Quarter: Median	Average Firms Followed
All (2012-2015)	1,391	11,167	172,566	9.05	4.00	8.06
2012	772	1,370	13,007	6.61	3.00	6.42
2013	1,271	1,612	24,750	5.88	3.00	9.67
2014	1,326	2,167	44,457	7.88	3.00	10.61
2015	1,362	7,555	90,352	13.82	6.00	7.05

Panel B: Characteristics of Estimize Firms

	Observations	Contributors Per Firm Quarter: Average	Contributors Per Firm Quarter: Median	% Quarters with Coverage	Average Firm Characteristics: IBES Coverage	Average Firm Characteristics: Market Cap ($Bil)	Average Firm Characteristics: Book-to-Market
2012 Additions	772	11.70	6.25	90.02%	20.17	18.62	0.41
2013 Additions	509	2.53	2.09	75.87%	12.35	3.71	0.53
2014 Additions	74	1.66	1.46	48.09%	9.14	2.24	0.43
2015 Additions	36	1.02	0.42	12.50%	8.11	1.20	0.47
Not on Estimize	451	0.00	0.00	0.00%	7.96	2.54	0.58

Treated firms

Control firms

Estimize vs. IBES Quarterly Forecasts: Table 2

	Mean	*Median*	*Std Dev*	*25th*	*75th*
Panel A: Estimize Forecasts					
Coverage	12.64	6.00	26.16	3.00	13.00
Forecast Age	9.71	6.33	11.42	2.00	13.60
Bias/Prc	0.00	0.01	0.28	-0.06	0.09
Bias/AbsConsensus	-0.01	0.01	0.32	-0.05	0.07
MBE	55.81%	100.00%	49.66%	0.00%	100.00%
AbsFE	0.17	0.08	0.23	0.03	0.21
Panel B: IBES Forecasts					
Coverage	14.38	13.00	8.19	8.00	19.00
Forecast Age	63.79	66.79	21.58	48.83	79.96
Bias/Prc	0.05	0.04	0.39	-0.02	0.13
Bias/AbsConsensus	0.05	0.03	0.40	-0.02	0.11
MBE	68.85%	100.00%	46.31%	0.00%	100.00%
AbsFE	0.20	0.08	0.33	0.03	0.21

Research Design Details

- Propensity score matching in pre-event period
  - Four firm characteristics: Log *(Size*), *Book-to-Market*, Turnover, and Log (*Coverage*)*,* and two forecast characteristics: *Bias/Prc* and *AbsFE*

- *Abnormal Bias/Prc*: residual from a panel regression of *BIAS/Prc* on control variables and industry and time fixed effects in full period

Characteristics of Treated and Control Firms (Table 3)

Panel A: Characteristics of Treated Firms and Candidate Control Firms				
	Treated	Candidate Control	Treated - Control	t(Treated - Control)
Log *(Size)*	15.25	13.26	1.99	(23.23)
Log *(IBES Coverage)*	2.73	1.78	0.95	(23.09)
Book-to-Market	0.42	0.73	-0.31	(-16.97)
Turnover	12.23	7.17	5.06	(12.74)
Return	0.05	0.06	-0.01	(-0.72)
Bias/Prc	0.14	0.03	0.11	(5.94)
AbsFE	0.33	0.71	-0.38	(-16.68)
Propensity Score	80.54	31.30	49.24	(32.72)
Panel B: Characteristics of Treated Firms and Matched Control Firms				
	Treated	Matched Control	Treated - Matched	t(Treated - Matched)
Log *(Size)*	15.00	15.11	-0.11	(-0.44)
Log *(IBES Coverage)*	2.61	2.58	0.03	(0.31)
Book-to-Market	0.45	0.48	-0.03	(-0.90)
Turnover	11.22	12.96	-1.74	(-1.21)
Return	0.06	0.05	0.01	(0.86)
Bias/Prc	0.14	0.10	0.05	(1.65)
AbsFE	0.35	0.37	-0.02	(-0.49)
Propensity Score	77.38	77.38	0.00	(0.00)

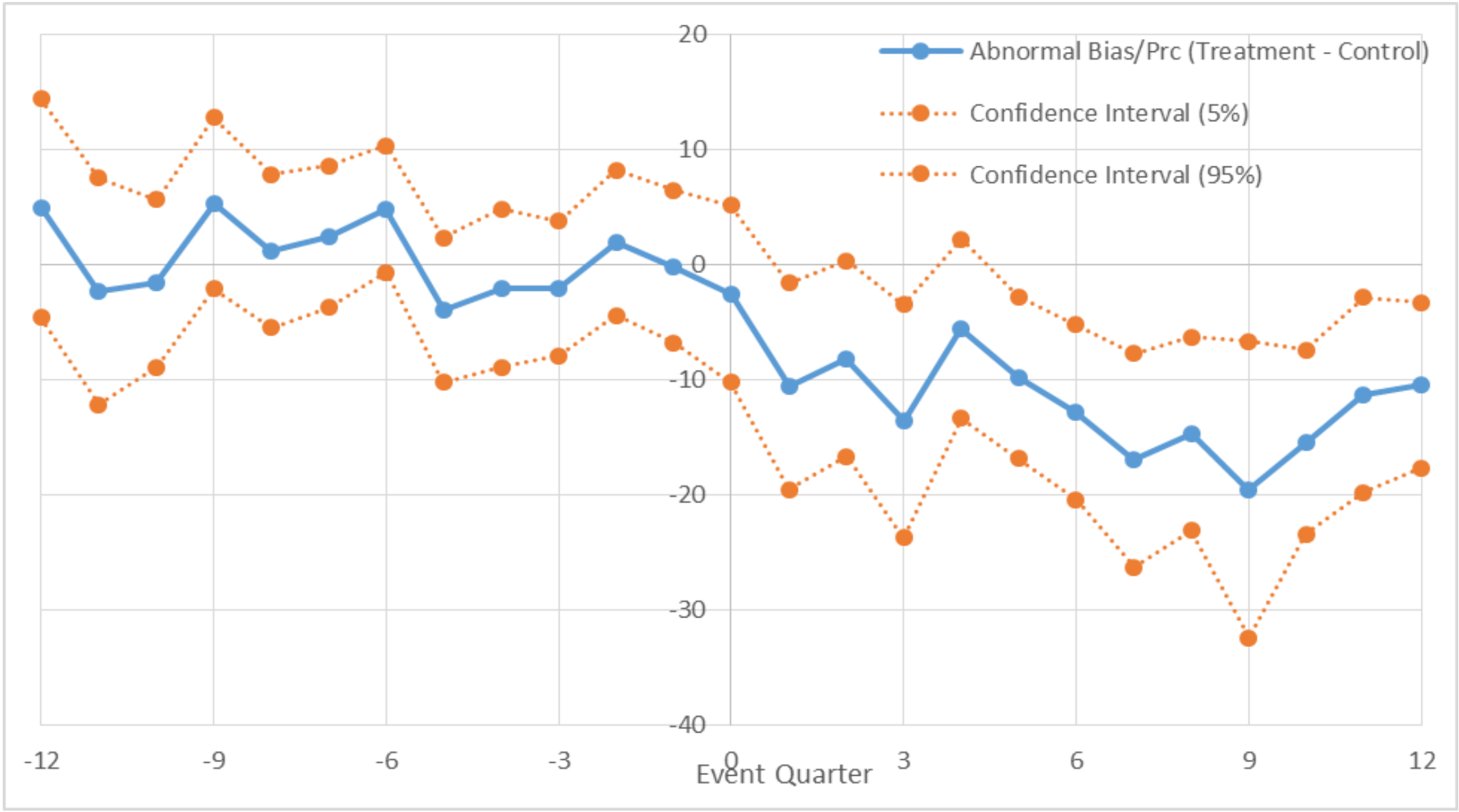
Effect of Estimize Coverage on Bias: Table 4

Panel A: Bias/Prc				
	Before	*After*	*Difference*	*t(Dif.)*
Estimize (Treated)	0.14	0.04	-0.10	(-4.22)
Matched Control	0.10	0.13	0.03	(0.86)
Estimize - Control	0.05	-0.09	-0.13	(-3.79)
Panel B: Abnormal Bias/Prc				
	Before	*After*	*Difference*	*t(Dif.)*
Estimize (Treated)	0.03	-0.02	-0.04	(-3.67)
Matched Control	0.02	0.10	0.08	(2.33)
Estimize - Control	0.00	-0.12	-0.12	(-3.53)

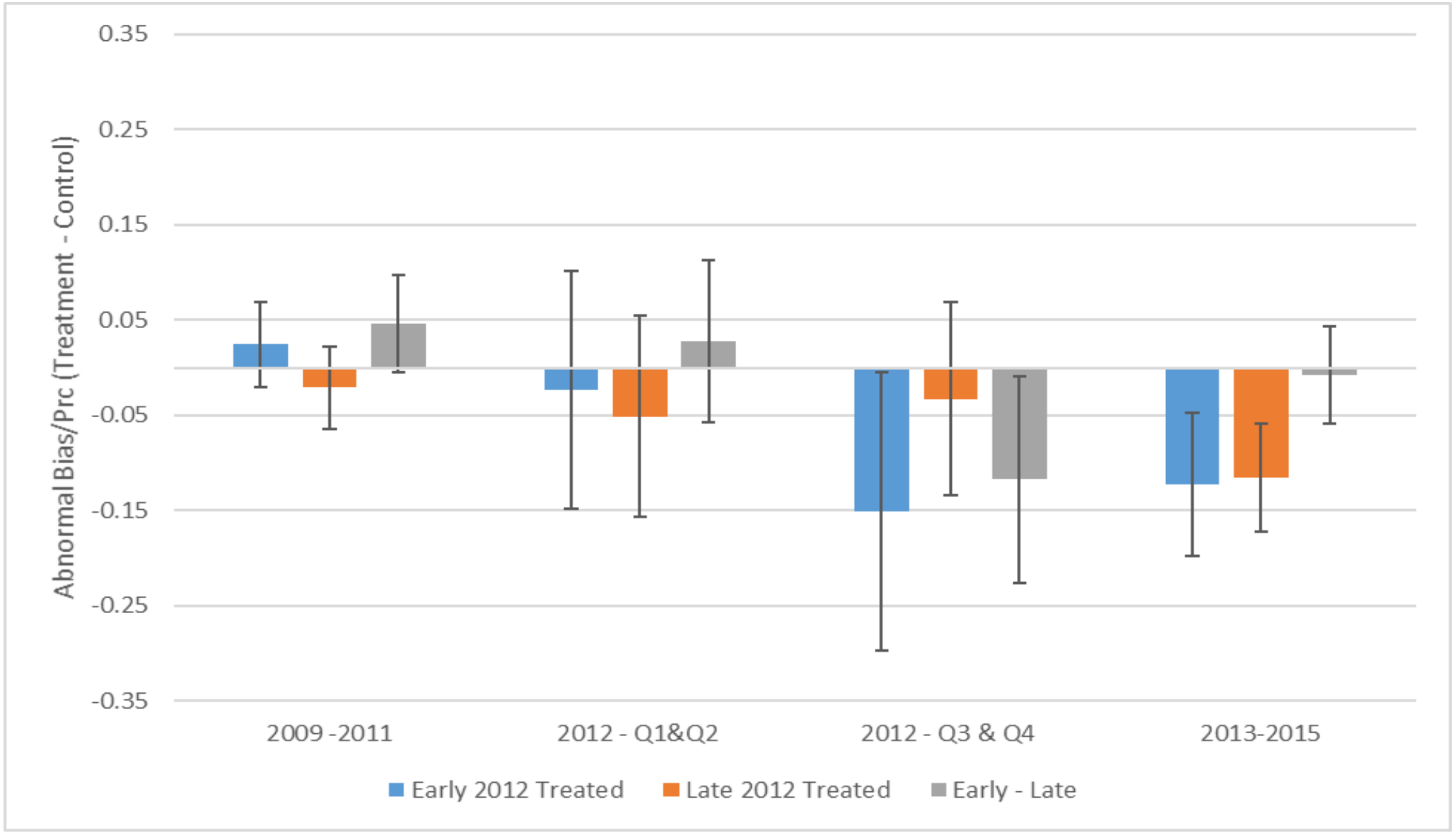
Effect of Estimize Coverage on Bias – Robustness: T5

Difference-in-Difference in Bias		
	Estimate	t-stat
Baseline Results	-0.13	(-3.79)
Alternative Matching Approaches		
1. Propensity Score Matching - No Common Support	-0.15	(-3.89)
2. Coarsened Exact Matching	-0.10	(-2.53)
3. Entropy Balancing (Third Moment)	-0.17	(-2.04)
Alternative Measures of Bias		
4. Median Bias/Prc	-0.09	(-3.16)
5. Bias/AbsConsensus	-0.18	(-3.29)
6. Meet or Beat	-0.09	(-1.98)
7. Bias/Prc with Analyst-Firm Fixed Effects	-0.09	(-2.36)
8. Statistical Bias (Placebo Test)	0.02	(0.41)
Alternative Treatment Samples		
9. Additions (2014-2015 post period)	-0.05	(-1.22)
Alternative Subsamples		
10. Drop Firm-Quarters with Management Guidance	-0.15	(-3.99)

Differences in Bias in Event Time: Figure 2



Early 2012 Treated Firms versus Late 2012 Treated Firms: Figure 3



Effect of Estimize Industry Coverage on Bias

- Greater ability to debias earnings forecasts for other firms and form more accurate expectation of industry earnings should help with debiasing earnings forecasts for all firms in the industry
  - Industry-level competition exerts a distinct disciplining effect (Merkeley, Michaely, and Pacelli, 2017)

Panel A: 10 Industries with Highest Estimize Coverage

Rank	Sector	Industry	Estimize Industry Coverage
1	Industrials	Industrial Conglomerates	83.33%
2	Consumer Staples	Food & Staples Retailing	81.82%
3	Consumer Staples	Beverages	77.78%
4	Consumer Discretionary	Multiline Retail	75.00%
5	Consumer Discretionary	Specialty Retail	73.44%
6	Consumer Staples	Food Products	70.37%
7	Consumer Discretionary	Consumer Services	68.75%
8	Materials	Chemicals	68.00%
9	Industrials	Capital Goods	67.86%
10	Healthcare	Health Care Technology	66.67%

Panel B: 10 Industries with Lowest Estimize Coverage

Rank	Sector	Industry	Estimize Industry Coverage
1	Financials	Thrifts & Mortgage Finance	0.00%
2	Financials	Banks	5.63%
3	Financials	Insurance	6.98%
4	Real Estate	Equity REITs	8.62%
5	Utilities	Water Utilities	11.11%
6	Materials	Paper & Forest Products	14.29%
7	Telecom	Wireless Telecommunication Services	14.29%
8	Utilities	Gas Utilities	21.43%
9	Telecom	Diversified Telecommunication Services	23.08%
10	Healthcare	Biotechnology	26.67%

Effect of Estimize Industry Coverage on Bias: Table 6

Industry Coverage	*Treated Firms*	*Late Treated*	*Control Firms*
3 (High)	-0.19	-0.14	-0.14
	(-4.61)	(-3.03)	(-2.24)
2	-0.10	-0.03	0.11
	(-2.51)	(-0.77)	(1.91)
1 (Low)	-0.09	-0.02	0.06
	(-1.79)	(-0.53)	(0.96)
High - Low	-0.10	-0.12	-0.20
	(-2.31)	(-2.55)	(-2.28)

Learning vs. Disciplining?

- We expect to see learning if bias is behavioral, and disciplining if bias is strategic

- Better conditions for learning ⇏ greater decline in bias

- Greater need for disciplining ⇒ greater decline in bias

Learning vs. Disciplining?

- Learning Variables -
  - ***Current Qtr Learn*** *= 1 for forecasts that are subsequent to at least 1 Estimize forecast, zero otherwise.*
  - ***Prior Qtr(s) Learn*** *= 1 if Estimize consensus more accurate than sell-side consensus in prior quarter (across all prior quarters).*
- Disciplining Variables – equals one for firm-quarters where fraction of analysts with close/friendly relations with management exceeds median.
  - Proxies include: ***Rec Optimism, Underwriter Relation, Conference Call Participation, Conference Host***

Learning vs. Disciplining? (Table 7)

	[1]	[8]
Post	-0.184	-0.046
	(-3.95)	(-0.89)
*Post*Current Qtr Learn*	0.055	
	(1.53)	
*Post*Prior Qtr Learn*		0.016
		(1.04)
*Post*Prior Qtrs Learn*		0.014
		(0.51)
*Post*Rec Optimism*		-0.049
		(-4.89)
*Post*Underwriting*		-0.047
		(-2.10)
*Post*CC Participation*		-0.053
		(-1.98)
*Post*ConfHost*		-0.049
		(-1.75)
Other Controls	Yes	Yes

Learning vs. Disciplining?

- Learning – improvements in accuracy even when Pre-Estimize sell-side forecasts are not biased.

- Disciplining – improvements in accuracy only if Pre-Estimize forecasts are biased.
  - Accuracy improves only as a byproduct of the reduction in bias.

Learning vs. Disciplining? (Table 8)

Panel A: Mean Pre-Event Values					
	All	*High*	*Medium*	*Low*	*High - Low*
1. Bias/Prc	0.14	0.52	0.12	-0.13	0.65
2. AbsFe	0.34	0.68	0.22	0.40	-0.28
Panel B: Difference-in-Difference Estimates					
	All	*High*	*Medium*	*Low*	*High-Low*
1. Bias/Prc	-0.13	-0.43	-0.10	0.04	-0.47
	(-3.79)	(-8.15)	(-2.50)	-0.96	(-8.51)
2. AbsFe	-0.10	-0.39	-0.03	-0.05	-0.34
	(-3.11)	(-7.59)	(-0.74)	(-1.18)	(-6.20)

Estimize (Non)Effect on Other Biases

- Pervasive market and regulatory forces should affect all forms of biases
- As a provider of short-term forecasts, Estimize should affect *only* short-term pessimism

Estimize arrival ⇏ decline in optimism in long term forecasts and stock recommendations

Estimize (Non) Effect on Other Forms of Bias (Table 10)

Panel A: Two-Quarter Ahead Earnings				
	Before	*After*	*Difference*	*t(Dif)*
Estimize	0.00	-0.08	-0.08	(-1.26)
Matched Control	0.02	0.00	-0.02	(-0.30)
Estimize - Control	-0.02	-0.08	-0.06	(-1.10)
Panel B: Three-Quarter Ahead Earnings				
	Before	*After*	*Difference*	*t(Dif)*
Estimize	-0.11	-0.16	-0.05	(-0.47)
Matched Control	-0.02	-0.04	-0.02	(-0.26)
Estimize - Control	-0.09	-0.12	-0.03	(-0.47)
Panel C: Four-Quarter Ahead Earnings				
	Before	*After*	*Difference*	*t(Dif)*
Estimize	-0.19	-0.21	-0.02	(-0.15)
Matched Control	-0.12	-0.16	-0.04	(-0.41)
Estimize - Control	-0.06	-0.04	0.02	(0.26)
Panel D: Five-Quarter Ahead Earnings				
	Before	*After*	*Difference*	*t(Dif)*
Estimize	-0.21	-0.26	-0.05	(-0.36)
Matched Control	-0.21	-0.26	-0.05	(-0.39)
Estimize - Control	0.00	0.00	0.00	(0.00)
Panel E: Recommendation Level				
	Before	*After*	*Difference*	*t(Dif)*
Estimize	2.25	2.35	0.10	(4.67)
Matched Control	2.32	2.39	0.07	(1.66)
Estimize - Control	-0.07	-0.04	0.03	(0.56)

Concluding Remarks

- Firms added to Estimize experience reduction in bias
  - Consistent with competition from Estimize disciplining sell-side analysts.

- Paint a more complete picture of how financial technology is changing information production and dissemination
  - Crowdsourced research is valuable not only because the forecasts themselves are informative, but also because they improve the forecasts of incumbents.

- Highlights a new market force constraining sell-side conflicts of interest
  - *Regulatory implications:* regulating sell-side analyst activities and disclosures or encourage new competitors?